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JUNTIMA, NITTAYA	
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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 09/518,452	Applicant(s) HEATH, ROBERT JEFF	
	Examiner Nittaya Juntima	Art Unit 2663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on October 10, 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-50 is/are pending in the application.

4a) Of the above claim(s) 12 is/are withdrawn from consideration.

5)☒ Claim(s) 1-4,16,20,32 and 41 is/are allowed.

6)☒ Claim(s) 5-15,17-19,21-31,33-40 and 42-50 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 3/32000 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. This action is in response to the amendment filed on October 10, 2003.

2. The objections to claims 2,5,10-12,15-18,20,23,28,30,33,37,39,42, and 47 are withdrawn in view of Applicant's amendment.

3. Claims 1-4, 16, 20, 32, and 41 are allowed.

4. Claim 12 is cancelled as per Applicant's amendment.

5. Claims 5-11, 13-15, 17-19, 21-31, 33-40, and 42-50 are rejected under 35 U.S.C. 103 (a).

6. Claims 18, 27-28, and 36-37 are rejected under the second paragraph of 35 U.S.C. 112.

Claim Objections

7. Claim 16 is objected to because of the following informalities: in line 8, "contention channel" should be changed to "contention channels". Appropriate correction is required.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 18, line 2, "the receiving step" lacks antecedent basis.

Claim 27, lines 1-2, "the receiving step" lacks antecedent basis.

Claim 28, line 2, "the determining step" lacks antecedent basis.

Claims 36-37, line 2, "the transmitting step" lacks antecedent basis.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. **Claims 5-8** and **10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Montpetit (USPN 6,366,761 B1) in view of Sasuta (USPN 5,325,598).

Per **claim** 5, Montpetit teaches ***a processor*** (a bandwidth allocation processor BAP 85 in Fig. 10 of LEO satellite 13f in Fig. 3, col. 9, lines 40-52) ***commands*** (allocation bandwidth responses generated by BAP 85, col. 9, lines 40-52 and col. 17, lines 15-20) ***a plurality of channels*** (uplink bandwidths are allocated as data channels as known in the art to requesting terminals, col. 9, lines 40-52, and a contention channel, col. 10, lines 1-5), ***terminals*** (ground terminals, 21a-d, Fig. 3, col. 4, lines 54-64 and col. 11, lines 4-20), ***a receiver and a transmitter*** (the bandwidth allocation processor onboard a LEO satellite in a bandwidth-on-demand apparatus receives bandwidth requests from and transmits bandwidth allocation responses to the ground terminals, therefore, it is inherent that the apparatus must include a transmitter and a receiver to perform the transmitting and receiving functions, col. 9, lines 40-42), ***a contention channel*** (col. 10, lines 9-17), ***a data channel*** (uplink bandwidth is allocated to ground terminals for data transmission, therefore, a data channel must be provided on an uplink direction for transmission of data (terminal traffic), col. col. 9, lines 40-42 and 55-58), ***the processor allocates each of the channels as a contention channel or a data channel*** (bandwidth request is transmitted using existing allocated bandwidth or a contention channel, therefore, it is inherent

that the processor allocates its channels as a data channel or a contention channel, col. 10, lines 1-5).

However, Montpetit does not teach dynamically changing allocation of at least one channel from a data channel to a contention channel based on an amount of bandwidth requests pending at any given time.

As shown in Fig. 2, Sasuta teaches ***dynamically*** (when system becomes busy) ***changing allocation of at least one channel*** (one of communication resources) ***from a data channel*** (a voice channel carrying voice traffic) ***to a contention channel*** (a voice/control channel) ***based on an amount of bandwidth requests*** (more requests for allocation of resources than can be processed) ***pending at any given time*** (col. 1, lines 20-44, col. 2, lines 21-26, 65- col. 3, lines 1-40).

Given the teaching of Sasuta, it would have been obvious to one skilled in the art to incorporate dynamically changing allocation of one channel from a data channel to a contention channel based on an amount of bandwidth requests pending at any given time into the apparatus of Montpetit to enable a ground terminal to immediately communicate with a bandwidth allocator, e.g. when the ground terminal has an emergency condition, during system overload as taught by Sasuta (col.1, lines 44-50 and 65-68).

Per **claim 6**, Montpetit teaches ***a plurality of queues connected to the processor*** (onboard computer queues OBC 69 where the processor BAP 85 writes to, reads from, and inherently stores the bandwidth requests as part of bandwidth allocation processing, further the processor BAP 85 inherently allocates uplink bandwidths as data channels in accordance with the bandwidth requests stored in the queues to properly accommodate the uplink bandwidth

requirements according to the assigned priorities, Fig. 10, col. 13, lines 28-41 and col. 16, lines 29-39).

Per **claim 7**, Montpetit teaches that ***the channels*** (data channels providing uplink bandwidth as described in claim 5) ***correspond to timeslots in frames*** (Fig. 7 and col. 7, lines 41-63), ***the processor allocates the timeslots accordingly to the bandwidth requests and a bandwidth allocation algorithm*** (the programmable bandwidth allocation rules, col. 13, lines 44-52), ***and generates the commands*** (bandwidth allocation response, col. 9, lines 40-42, and col. 11 lines 7-11) ***accordingly*** and ***the terminals process the commands and use the timeslots accordingly*** (col. 11, lines 12-27).

Per **claim 8**, Although Montpetit fails to teach a selected minimum number of contention channels, it would have been obvious to one skilled in the art to configure the contention channels using a minimum number in order to minimize the risk of unsuccessful delivery of data packet/bandwidth requests using a contention channel (col. 10, lines 15-23).

Per **claim 10**, Montpetit teaches that ***one of the terminals transmits a bandwidth request via a contention channel*** (col. 10, lines 1-14), and ***transmit other bandwidth requests subsequent to receiving channel allocations in response to the bandwidth request as inband messages via allocated data channels*** (the terminal with insufficient bandwidth sends a bandwidth request to the satellite via a contention channel, the bandwidth is allocated to the terminal, the terminal then uses the allocated bandwidth to send subsequent requests using in-band data transmission, Fig. 5, col. 10, lines 9-12 and 29-38).

11. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Montpetit (USPN 6,366,761 B1) in view of Sasuta (USPN 5,325,598), and further in view of Mann et al. (USPN 5,167,035).

Montpetit teaches that ***the processor*** (BAP 85 in Fig. 10) ***generates and transmits a signal*** (a bandwidth allocation response) ***via the transmitter*** (inherently connected to encoder/modulator 77 in Fig. 10) ***to one of the terminals indicating that a channel release request*** (a bandwidth request with a minus sign for deallocation, col. 10, lines 55-58) ***has been processed*** (since bandwidth allocation response reporting outcome of allocation process is generated by BAP 85, col. 17, lines 15-20, and bandwidth deallocation is also provided, col. 17, lines 48-58, therefore, it is inherent that BAP 85 must generate the bandwidth allocation response that includes outcome of the deallocation request(s) and transmit it via the transmitter to the ground terminal(s) that submitted the request(s)), but fails to teach a timer and waiting until a timer expires before transmitting another request.

As shown in the Fig. 7A-1, Mann et al. teaches that a timer is provided to a client node 10 and the client node 10 is programmed to wait until the timer expires before transmitting another message/request (col. 10, lines 14-21 and col. 16, lines 7-15).

Therefore, it would have been obvious to one skilled in the art to incorporate a timer and waiting until a timer expires before transmitting another request of Mann et al. into the terminal of Montpetit to wait for the maximum time permitted following transmission of a bandwidth request before a response is expected as taught by Mann et al. (col. 10, lines 14-17).

12. **Claims 11** and **13-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Montpetit (USPN 6,366,761 B1).

Per **claim 11**, Montpetit teaches ***a bandwidth on demand communication system*** (Fig. 10), ***channels*** and ***timeslots*** (inherently correspond to uplink bandwidth/data channel for scheduled data transmission and contention channel for unscheduled data and bandwidth request, col. 7, lines 44-54 and col. 10, lines 1-5), ***the bandwidth requests*** (bandwidth requests include rate request, col. 10, lines 39-48, and inherently include volume requests since volume-based allocation is used, col. 9, lines 8-10) ***rate request*** (col. 7, lines 65-col. 8, lines 1-5) ***rate requests are characterized as high priority or low priority*** (high priority rate-based bandwidth P1 requests, col. 9, lines 1-5, see also col. 6, lines 3-41 and low priority rate-based bandwidth requests must be inherently included to differentiate priority levels), ***volume requests*** (col. 8, lines 32-48), ***terminal traffic*** (data packets, col. 4, lines 37-40, see also col. 2, lines 27-33), ***volume requests are characterized as either high priority or low priority*** (col. 8, lines 48-58), ***terminals*** (ground terminals 21a-d in Fig. 3, and col. 10, lines 1-5), ***a processing device for providing channel allocations*** (the bandwidth allocation processor BAP 85 in Fig. 10, col. 9, lines 40-42, and col. 13, lines 32-34), ***a first queue*** (P1), ***a second queue*** (P2), ***a third queue*** (P3), ***and a fourth queue*** (P4) (since (i) multiple queues OBC 69 in Fig. 10 are provided according to four priority levels: P1, P2, P3, and P4, col. 13, lines 28-29 and 34-41 and col. 6, lines 3-41, (ii) rate-based bandwidth allocation has higher priority than volume-based allocation, col. 9, lines 10-12 and 26-27, see also col. 8, lines 11-13 and 35-41, and (iii) volume based allocations have high or low priority levels, col. 8, lines 48-58, therefore, a first queue for storing high priority rate-based requests, a second queue for storing low priority rate-based requests, a

third queue for storing high volume-based requests, and a fourth queue for storing low volume-based requests are inherently provided in multiple OBC queues 69 to enable it to efficiently process the requests according to the assigned priorities), ***allocating number of timeslots in each frame to the first and second queues accordingly*** (col. 13, lines 37-46), ***the sum of the number of the allocated timeslots in each frame not exceeding a total number of timeslots in a frame*** (col. 7, lines 44-63 and col. 17, lines 14-19), ***allocation to the second queue*** (P2) ***being preempted by the first queue*** (P1) and ***volume requests*** (P3 and P4) ***being preempted by one of rate requests stored in first and second queues*** (lower priority queue is preempted in favor of higher priority queue with P1 having highest priority and P4 having lowest priority, col. 13, lines 49-52).

Although Montpetit teaches the first, second, third, and fourth queues, Montpetit fails to teach that the queues are included in the processing device.

However, it would have been obvious to one skilled in the art to integrate the first, second, third, and fourth queues, i.e. multiple OBC queues 69 in Fig. 10 as explained above, into the processing device, i.e. the bandwidth allocation processor BAP 85, to achieve faster queue transaction without altering functions of the OBC queues 69, i.e. providing memory accessible internally to the processor BAP 85 and externally to other onboard processors.

Per **claim 13**, Montpetit teaches that ***volume requests stored in the fourth queue*** (as explained in claim 11) ***are preempted by an allocation of at least one of the first, second, and third queues*** (lower priority queue is preempted in favor of higher priority queue, col. 13, lines 49-52).

Per **claims 14**, although Montpetit fails to teach that the volume requests are allocated on a round-robin basis, it would have been obvious to one skilled in the art to program the processing device (the bandwidth allocation processor BAP 85 in Fig. 10, col. 13, lines 32-41 and 65-col. 14, lines 1-3) to allocate the timeslots in each frame to the volume requests in the third and fourth queues using a simple allocation scheme such as a round-robin so that timeslots are allocated in an orderly fashion and without contention.

Per **claim 15**, Montpetit teaches providing a volume-based bandwidth allocation with portions of the request satisfied over a number of frames (col. 8, lines 42-48 and col. 16, lines 29-45), therefore, it is inherent that the processing device BAP 85 in Fig. 10 assigns the timeslots to as many of the volume requests stored in the third and fourth queues and continue to store the volume requests in respective queues until the requests for the bandwidth have all been allocated.

13. **Claims 17-19, 21-31, 33-40,** and **42-50** are rejected under 35 U.S.C. 103(a) as being unpatentable over Montpetit (USPN 6,366,761 B1) in view of Natarajan (USPN 5,699,355).

Per **claims 17** and **29,** Montpetit teaches *(claim 17 only)* ***receiving a bandwidth request from a terminal over a communication channel*** (satellite 12f in Fig. 3 receives a bandwidth request from a ground terminal 21a in Fig. 3 over a contention channel, col. 10, lines 1-5 and 39-43, and col. 7, lines 65-col. 8, line 1 and 32-37), ***determining allocation of the transmission slots of the frame based upon the received bandwidth request*** (col. 9, lines 40-42, col. 13, lines 42-52, and col. 17, lines 15-20), ***distributing the allocated transmission slots through the frame according to a prescribed sequence*** (a prescribed sequence is not defined, therefore reads on time slot sequence shown in Fig. 7, col. 13, lines 44-52 and col. 14, lines 4-36), *(claim 17 only)*

selectively sending an allocation command (a bandwidth allocation response) ***identifying the allocated transmission slots to the terminal based upon the distributing*** and *(claim 29 only)* ***transmitting an allocation command*** (a bandwidth allocation response along with allocated transmission slots is sent to the requesting ground terminal, col. 11, lines 7-11 and col. 17, lines 15-20), *(claim 29 only)* ***transmitting a bandwidth request to a satellite over a communication channel*** (terminal 21a in Fig. 3 transmits a bandwidth request to satellite 13f in Fig. 3 over a contention channel, col. 10, lines 1-5 and 39-43, and col. 7, lines 65-col. 8, lines 1 and 32-37), *(claim 29 only)* ***receiving an allocation command from the satellite*** (the requesting ground terminal 21a in Fig. 10 receives a bandwidth allocation response sent from the satellite, col. 11, lines 4-11).

However, Montpetit fails to teach a slot numbering identifier identifying one of a plurality of slot numbering patterns.

Natarajan teaches ***a slot number identifier*** (the assigned time slot positions, e.g. "1,2,3,4" or "2,3,8,9" or "4,5,8,9") ***identifying one of a plurality of slot numbering patterns*** (contiguous or incontigous patterns) (col. 5, lines 39-48).

Therefore, it would have been obvious to one skilled in the art to include a slot number identifier of Natarajan into an allocation command of Montpetit to indicate on an allocation command sent by the satellite which contiguous or incontiguous timeslots of the frame are allocated to the requesting ground terminal.

Per **claims 18**, **30**, and **39**, Montpetit teaches ***the bandwidth request is a rate request which specifies a constant number of transmission slots*** (col. 7, lines 64-col. 8, lines 1-5) ***or a volume request which specifies a specific number of transmission slots*** (col. 8, lines 32-41).

Per **claims 19, 31,** and **40**, Montpetit teaches *(claim 19 only)* ***receiving a follow-up request from the terminal*** (the satellite receives a bandwidth request (a following up request) for an additional data packet associated with the volume-based request, which allows partial allocation, from the ground terminal requesting to obtain uplink bandwidth, Fig. 5, col. 9, lines 53-67, see also col. 8, lines 48-52), and ***selectively discarding the follow-up request based upon traffic load*** (since the volume-based bandwidth request with partial allocation is discarded after a timer expires and the request is not satisfied due to insufficient available bandwidth within a predetermined time period, therefore, it is inherent that the bandwidth request is discarded by BAP 85 in Fig. 10 of the satellite 13f in Fig. 3 due to the traffic load within the predetermined time period, col. 16, lines 29-45, see also col. 8, lines 42-52), *(claim 31 only)* ***transmitting a follow-up request to the satellite*** (in response to receiving additional data packet associated with the volume-based, the ground terminal 21a in Fig. 3 transmits a volume-based bandwidth request (a follow-up request), which allows partial allocation, to the satellite 13f in Fig. 3 to obtain additional uplink bandwidth, Fig. 5, col. 9, lines 53-67, see also col. 8, lines 48-52), *(claim 40 only)* ***a follow-up request from the terminal is stored in one the plurality of queues*** (the satellite inherently stores the volume-based bandwidth request for an additional data packet in one of the OBC queues 69 in Fig. 10, col. 16, lines 29-39).

Per **claims 21** and **33**, Montpetit teaches ***a rate/an original rate request requesting a first number of transmission slots*** (a rate bandwidth request is sent from a requesting terminal to the satellite specifying a number of timeslots, col. 9, lines 63-67, col. 10, lines 39-43, see also col. 7, lines 65-col. 8, line 1), *(claim 21 only)* ***placing the rate request in a queue*** (a rate request is placed in one of the multiple OBC queues 69 in Fig. 10, col. 13, lines 34-41),

receiving/transmitting another rate bandwidth request (reads on a new rate request with higher priority transmitted by a terminal to the satellite, col. 9, lines 55-67 and col. 13, lines 49-52), *(claim 21 only)* ***discarding the queued rate request and*** *(claim 33 only)* ***superseding the original rate request*** (lower priority request is denied/discarded due to preemption, col. 13, lines 49-52, see also col. 15, lines 57-61).

Montpetit does not teach a fallback rate requesting a different number of transmission slots of the frame than the first number of transmission slots in claim 21 and the original rate request in claim 33.

However, it is well known in the art that any two bandwidth requests may or may not requesting the same amount of slots in a frame, therefore, it would have been obvious to one skilled in the art to include a fallback rate into the method of Montpetit to satisfy the bandwidth request of a new rate request using preemption in a case when a new rate request has higher priority and requesting different number of slots in a frame than the previously allocated rate request so that higher priority requests is satisfied as suggested by Montpetit (col. 16, lines 7-17).

Per **claims 22, 34,** and **43,** Montpetit teaches that ***the rate request and the volume request each has two levels of priority*** (the volume request has high and low priority levels, col. 8, lines 48-58, and since the rate request has high priority level (col. 8, lines 1-5, see also col. 6, lines 3-14), therefore, and it is inherent that the rate request must also have to low priority level for rate bandwidth request that is not high priority rate request).

Per **claim 23**, Montpetit teaches ***placing the bandwidth request in a queue*** (request is placed in one of the multiple OBC queues 69 in Fig. 10, col. 13, lines 34-41) and since (i) multiple queues OBC 69 in Fig. 10 are provided according to four priority levels: P1, P2, P3, and

P4, col. 13, lines 28-29 and 34-41 and col. 6, lines 3-41, (ii) rate-based bandwidth has higher priority than volume-based, col. 9, lines 10-12 and 26-27, see also col. 8, lines 11-13 and 35-41, and (iii) volume based allocations have high or low priority levels, col. 8, lines 48-58, therefore, it is inherent that ***a queue is designated as one of at least a high priority rate request queue*** (P1), ***a low priority rate request queue*** (P2), ***a high priority volume request queue*** (P3), ***and a low priority request queue*** (P4) ***where the rate request queues are of higher priority than the volume request queues*** to enable BAP 85 to efficiently process the requests according to the assigned priorities (col. 13, lines 37-41).

Per **claim 24**, Montpetit fails to teach round robin queues. However, it would have been obvious to one skilled in the art to make volume request queues (P3 and P4 as explained in claim 23) round robin queues for orderly allocation with no contention.

Per **claim 25**, Montpetit does not teach reserving a minimum number of transmission slots for the low priority volume request queue. However, it would have been obvious to one skilled in the art to reserve a minimum number of slots for the low priority volume request queues in the system of Montpetit to maintain QoS of higher priority queues by using the preemption (col. 13, lines 49-52).

Per **claim 26**, Montpetit teaches ***receiving another bandwidth request from the terminal, the other bandwidth request*** (the other bandwidth request is not defined, reads on a new bandwidth having higher priority, col. 9, lines 55-67) ***being received using a previously allocated transmission slot*** (preemption, col. 13, lines 49-52).

Per **claims 27, 36**, and **46**, Montpetit teaches ***the frame is a TDMA frame*** (since the frame has a number of available time slots and is allocated to support a number of requesting terminals, it is inherent that the frame must be a TDMA frame, Figs. 3 and 7, col. 7, lines 49-63).

Per **claims 28**, **37**, and **47**, Montpetit teaches ***the communication channel is a data channel or a contention channel*** (a contention channel, col. 10, lines 1-5).

Per **claim 35**, Montpetit teaches ***piggybacking a follow-up request to the satellite*** (ground station inherently sends a bandwidth request (a follow-up request) for an additional data packet associated with the volume-based to the satellite to obtain uplink bandwidth using allocated bandwidth, col. 9, lines 53-67 and col. 10, lines 29-48).

Per **claim 38**, Montpetit teaches ***a plurality of queues configured to store a bandwidth request received from a terminal over a communication channel*** (a bandwidth request specifying a number of slots in a frame received from a terminal 21a in Fig. 3 over a contention channel is stored in one of the multiple queues OBC 69 in Fig. 10, col. 13, lines 29-30 and 34-41, col. 9, lines 55-67, and col. 10, lines 1-5 and 39-48), ***a bandwidth control processor communicating with the plurality of queues*** (a bandwidth allocation processor BAP 85 in Fig. 10, col. 13, lines 28-29 and 32-41), ***the bandwidth control processor configured to determine allocation of the timeslots of the frame based upon a received bandwidth request that is stored in one the plurality of queues*** (BAP 85 in Fig. 10 allocates bandwidth based on previously allocated request and preemption, col. 13, lines 44-53), ***distribute the allocated transmission slots throughout the frame according to a prescribed sequence*** (a prescribed sequence is not defined, therefore reads on time slot sequence shown in Fig. 7, col. 13, lines 44-52 and col. 14, lines 4-36)), and ***selectively send an allocation command identifying the allocated transmission***

slots to the terminal (a bandwidth allocation response identifying allocated transmission slots is sent to the requesting ground terminal, col. 11, lines 4-27).

However, Montpetit fails to teach one of a plurality of slot numbering patterns.

Natarajan teaches ***one of a plurality of slot numbering patterns*** (contiguous or incontigous patterns, e.g. "1,2,3,4" or "2,3,8,9" or "5,6,8,9," col. 5, lines 39-48).

Therefore, it would have been obvious to one skilled in the art to include a slot number identifier of Natarajan into an allocation command of Montpetit to indicate on an allocation command sent by the satellite which contiguous or incontiguous timeslots of the frame are allocated to the requesting ground terminal.

Per **claim 42**, Montpetit teaches that ***the plurality of queues store at least two rate requests*** (since rate-based bandwidth has P1- high priority level, col. 9, lines 10-11, it is inherent that rate-based bandwidth request must has low priority level to accommodate rate request that is not high priority, requests, and because many queues are provided by OBC 69 according to priority levels, col. 13, lines 34-41, therefore, it is inherent that OBC 69 store two rate requests; high and low priority, in separate queues), ***an original rate request*** (not defined, reads on rate request with low priority) ***and another one of the stored rate requests*** (another rate request with high priority), ***the bandwidth control processor*** (BAP 85) ***discarding the original rate request*** (lower priority request is denied/discarded due to preemption, col. 13, lines 49-52, see also col. 15, lines 57-61).

Montpetit does not teach a fallback rate requesting a different number of transmission slots of the frame than the original rate.

However, it is well known in the art that any two bandwidth requests may or may not requesting the same amount of slots in a frame, therefore, it would have been obvious to one skilled in the art to include a fallback rate into the system of Montpetit to satisfy the bandwidth request of a new rate request using preemption in a case when a new rate request has higher priority and requesting different number of slots in a frame than the previously allocated rate request so that higher priority requests is satisfied as suggested by Montpetit (col. 16, lines 7-17).

Per **claim 44,** (since (i) multiple queues OBC 69 in Fig. 10 are provided according to four priority levels: P1, P2, P3, and P4, col. 13, lines 28-29 and 34-41 and col. 6, lines 3-41, (ii) rate-based bandwidth allocation has higher priority than volume-based allocation, col. 9, lines 10-12 and 26-27, see also col. 8, lines 11-13 and 35-41, and (iii) volume based allocations have high or low priority levels, col. 8, lines 48-58, therefore, it is inherent that ***the plurality of queues are designated as a high priority rate request queue, a low priority rate request queue, a high priority volume request queue, and a low priority request queue where the rate request queues are of higher priority than the volume request queues*** to enable BAP 85 to efficiently process the requests according to the assigned priorities (col. 13, lines 34-41).

However, Montpetit fails to teach round-robin volume request queues and reserving a minimum number of transmission slots for the low priority volume request queue.

It would have been obvious to one skilled in the art to include providing round-robin volume request queues and reserving a minimum number of slots for the low priority volume request queues into system of Montpetit so that the volume requests with high and low priorities can be allocated on a round-robin basis with equal and orderly allocation while maintaining the preemption (col. 13, lines 49-52) and QoS of other higher priority queues.

Per **claim 45**, Montpetit teaches that the plurality of queues store another bandwidth request from the terminal (a new bandwidth request with higher priority sent by the ground terminal is received and stored in one of OBC 69 queues, col. 9, lines 53-67, Fig. 10 and col. 13, lines 34-41) the other bandwidth request received using a previously allocated transmission slot (preemption, col. 13, lines 44-52).

Per **claims 48-40**, the combined method and system Montpetit and Natarajan fail to explicitly teach that the plurality of slot numbering patterns comprises four slot numbering patterns.

However, since Natarajan discloses that the allocated timeslots can be contiguous or incontiguous (col. 5, lines 39-48), therefore, it would have been obvious to one skilled in the art to include any four slot numbering patterns, for example: (i) contiguous order: "1,2,3,4,5" and incontiguous orders: (ii) "3,5,6,7,8" (iii) "1,3,6,8,9" and (iv) "0,4,5,7,9," into the combined method and system of Montpetit and Natarajan to provide maximum flexibility in assigning timeslots when granting a new request.

Response to Arguments

14. Applicant's arguments with respect to claims 5-15, 17-19, 21-31, 33-40, and 42-47 have been considered but they are not persuasive.

a) In the remarks, Applicant argues that neither of the portions of Montpetit, or any other portions, discloses or suggests that the allocation command includes a slot numbering identifier identifying one of a plurality of slot numbering patterns, as recited in amended claims 17, 29, and 38.

In response, although Montpetit fails to teach a slot numbering identifier identifying one of a plurality of slot numbering patterns, Natarajan teaches ***a slot number identifier*** (the assigned time slot positions, e.g. "1,2,3,4" or "2,3,8,9" or "4,5,8,9") ***identifying one of a plurality of slot numbering patterns*** (contiguous or incontigous patterns) (col. 5, lines 39-48).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to include a slot number identifier of Natarajan into an allocation command of Montpetit to let the requesting terminal know which contiguous or incontiguous timeslots in the frame are allocated to it. The rejection of claims 17, 29, and 38 are maintained.

b) In the remarks, Applicant argues that Montpetit merely discloses dropping a follow-up request based on the expiration of a timer which is not equivalent to selectively discarding the follow-up based upon traffic load, as recited in claim 19.

In response, since the volume-based bandwidth request with partial allocation is discarded after a timer expires and the request is not satisfied due to insufficient available bandwidth within a predetermined time period, therefore, it is inherent that the bandwidth request is discarded by BAP 85 in Fig. 10 of the satellite 13f in Fig. 3 due to *the traffic load within the predetermined time period*, col. 16, lines 29-45, see also col. 8, lines 42-52.

c) In the remarks, Applicant argues that Montpetit does not teach a fallback rate that requests a different number of transmission slots of the frame than the first number of transmission slots, and discarding the queued rate request, as recited in amended claim 21.

In response, Montpetit does not teach a fallback rate requesting a different number of transmission slots of the frame than the first number of transmission slots in claim 21 and the original rate request in claim 33. However, it is well known in the art that any two bandwidth

requests may or may not requesting the same amount of slots in a frame, therefore, it would have been obvious to one skilled in the art to include a fallback rate into the method of Montpetit to satisfy the bandwidth request of a new rate request using preemption in a case when a new rate request has higher priority and requesting different number of slots in a frame than the previously allocated rate request so that higher priority requests is satisfied as suggested by Montpetit (col. 16, lines 7-17). Therefore, the rejection of claims 21, 33, and 42 is maintained.

d) In the remarks, Applicant further argues that Montpetit does not disclose dynamically changing the allocation of at least one channel from a data channel to a contention channel, as recited in amended claim 5.

In response, Montpetit does not teach dynamically changing allocation of at least one channel from a data channel to a contention channel based on an amount of bandwidth requests pending at any given time. However, as shown in Fig. 2, Sasuta teaches ***dynamically*** (when system becomes busy) ***changing allocation of at least one channel*** (one of communication resources) ***from a data channel*** (a voice channel carrying voice traffic) ***to a contention channel*** (a voice/control channel) ***based on an amount of bandwidth requests*** (more requests for allocation of resources than can be processed) ***pending at any given time*** (col. 1, lines 20-44, col. 2, lines 21-26, 65- col. 3, lines 1-40).

Given the teaching of Sasuta, it would have been obvious to one skilled in the art to incorporate dynamically changing allocation of one channel from a data channel to a contention channel based on an amount of bandwidth requests pending at any given time into the apparatus of Montpetit to enable a ground terminal to immediately communicate with a bandwidth

allocator, e.g. when the ground terminal has an emergency condition, during system overload as taught by Sasuta (col.1, lines 44-50 and 65-68). The rejection of claim 5 is therefore maintained.

e) In the remarks, Applicant argues that the statement in the Office Action regarding claim 9 merely amounts to a conclusory statement and provide no objective motivation for modifying Montpetit to include the features recited in claim 9.

In response, Montpetit fails to explicity teach a timer and waiting until a timer expires before transmitting another request. However, as shown in the Fig. 7A-1, Mann et al. teaches that a timer is provided to a client node 10 and the client node 10 is programmed to wait until the timer expires before transmitting another message/request (col. 10, lines 14-21 and col. 16, lines 7-15).

Therefore, it would have been obvious to one skilled in the art to incorporate a timer and waiting until a timer expires before transmitting another request of Mann et al. into the terminal of Montpetit to wait for the maximum time permitted following transmission of a bandwidth request before a response is expected as taught by Mann et al. (col. 10, lines 14-17). The rejection to claim 9 is maintained.

f) In the remarks, Applicant argues that Montpetit fails to disclose the claimed first, second, third, and fourth queues, much less than that volume requests stored in the third and fourth queues are preempted for at least one frame by allocation of timeslots to at least one of rate requests stored in the first and second queues, as recited in claim 11, and the provided motivation comes from the applicant's disclosure which may not be properly relied upon under 35 U.S.C. 103 (a).

In response, Montpetit discloses that:

(i) multiple queues OBC 69 in Fig. 10 are provided according to four priority levels: P1, P2, P3, and P4, col. 13, lines 28-29 and 34-41 and col. 6, lines 3-41,

(ii) rate-based bandwidth allocation has higher priority than volume-based allocation, col. 9, lines 10-12 and 26-27, see also col. 8, lines 11-13 and 35-41, and

(iii) volume based allocations have high or low priority levels, col. 8, lines 48-58.

Therefore, ***a first queue for storing high priority rate-based requests, a second queue for storing low priority rate-based requests, a third queue for storing high volume-based requests, and a fourth queue for storing low volume-based requests*** are *inherently provided* in multiple OBC queues 69 to enable it to efficiently process the requests according to the assigned priorities),

However, Montpetit fails to teach the first, second, third, and fourth queues are included in the processing device.

It would have been obvious to one skilled in the art to incorporate a first, second, third, and fourth queues (multiple OBC queues 69 in Fig. 10 as explained above) into ***a processing device*** (the bandwidth allocation processor BAP 85, see rejection of claim 11) to efficiently process of the requests according to the assigned priorities (col. 13, lines 34-41) and still achieve faster queue transaction without altering the functions of the OBC 69, i.e. prioritized queues are now accessible *within* OBC 69 and are still accessible to other onboard processors. Therefore, the rejection of claim 11 is maintained.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nittaya Juntima whose telephone number is 703-306-4821. The examiner can normally be reached on Monday through Friday, 8:00 A.M - 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chau Nguyen can be reached on 703-308-5340. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

Nittaya Juntima
January 12, 2004
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